

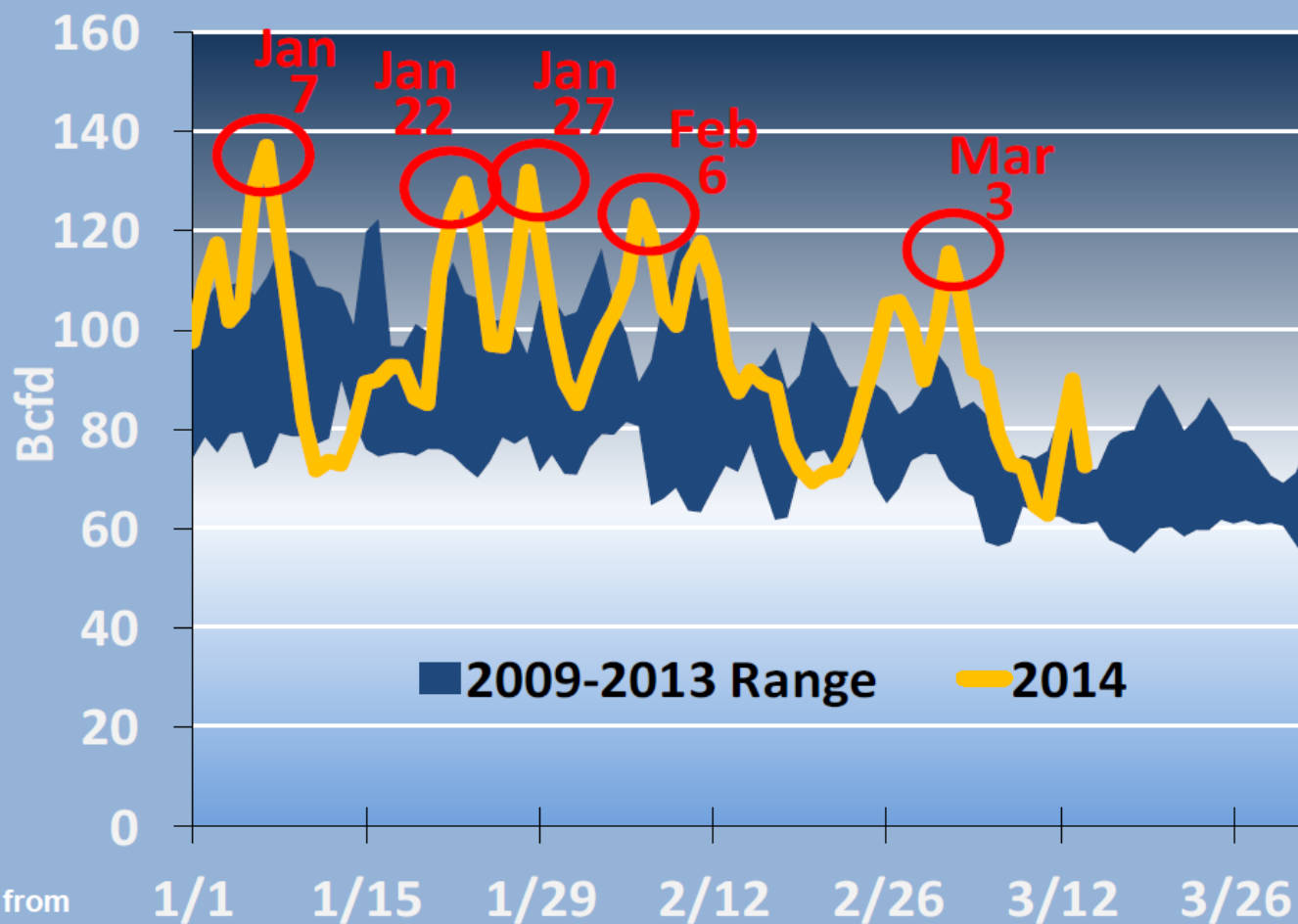
# Natural Gas Price Risk: An Anomaly of Last Winter or a Warning for Wisconsin?





# Natural Gas Demand Soars Well Beyond 5-yr Averages

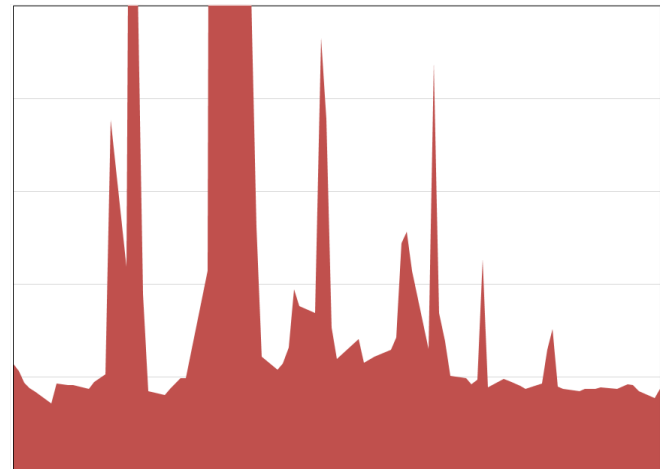
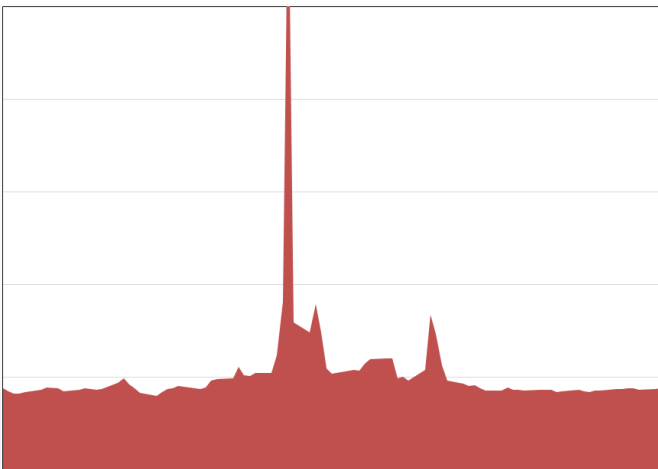
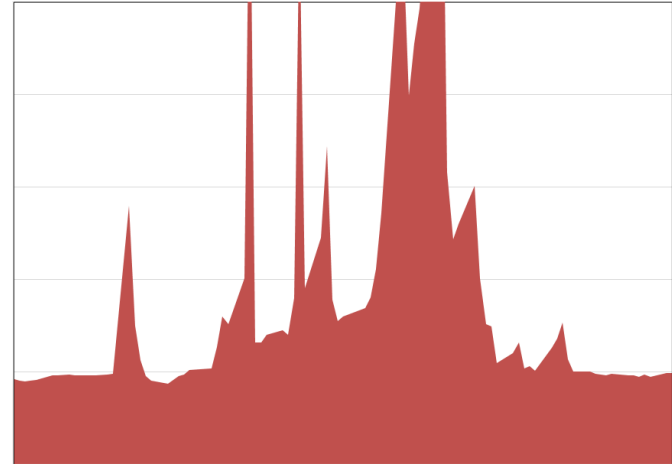
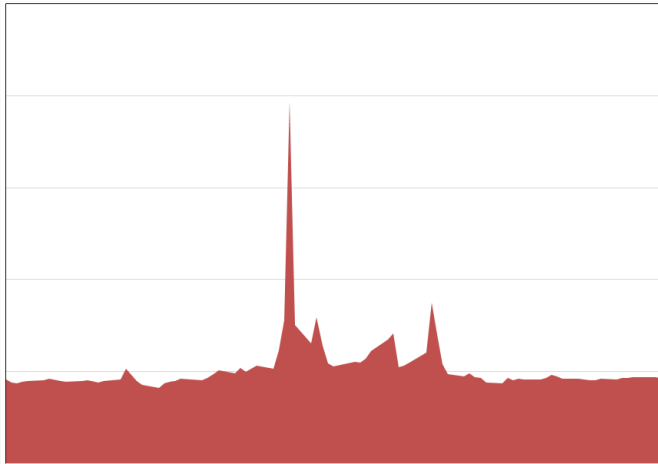
Jan. 6 was  
the peak  
flow for  
Wisconsin  
LDCs.



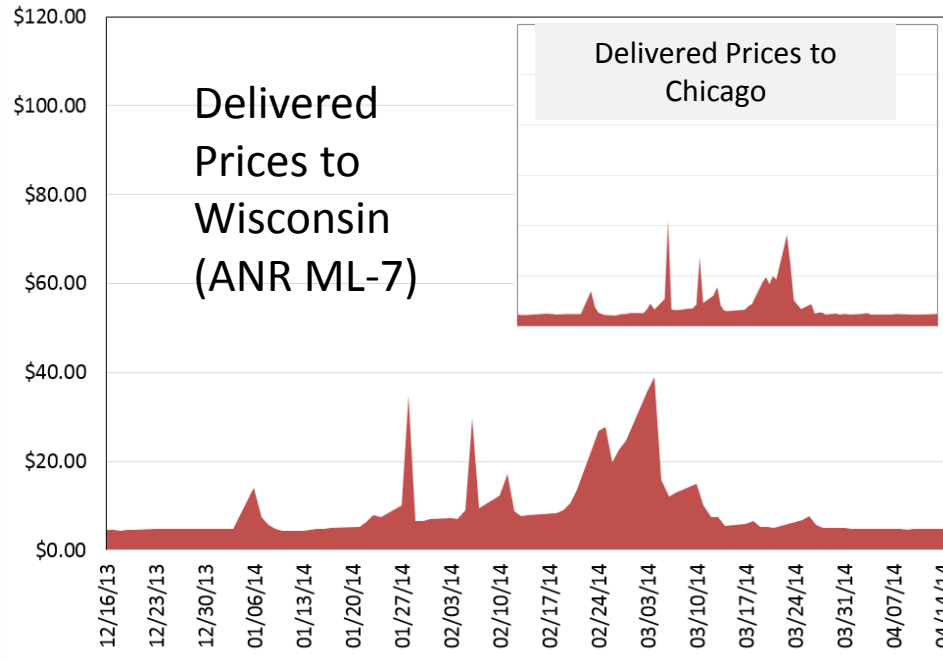
Source: Derived from  
Bentek Energy data.

# Delivered Natural Gas Prices

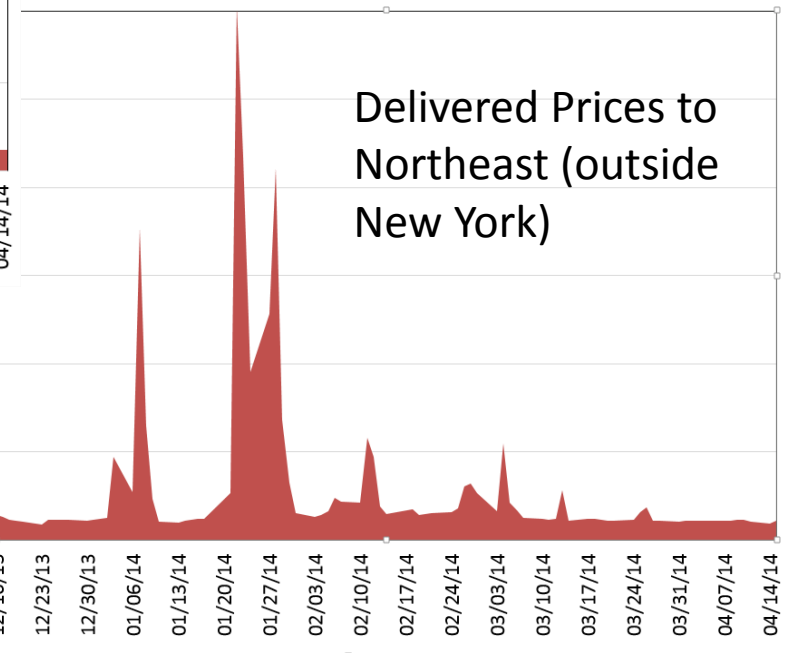
Mid-Dec to Mid-Apr: Which looks worse?



# Wisconsin Needs to Avoid

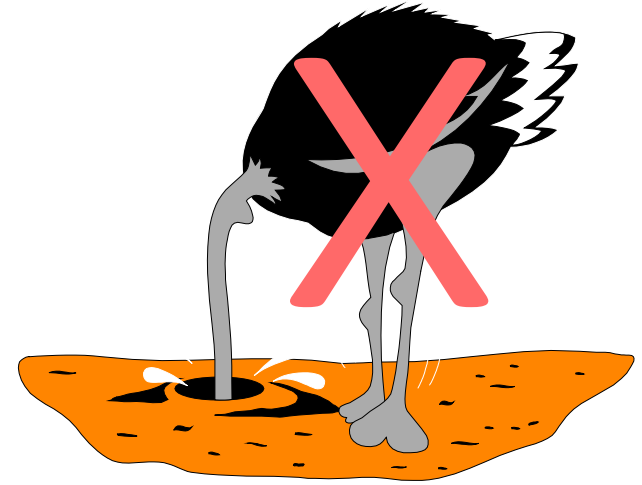


THIS



Per MMBtu	Henry Hub, LA	WI	Chicago	NE
>\$20	0 days	8 days	4 days	10 days
\$12-\$20	0 days	9 days	8 days	5 days
\$8-\$12	1 day	10 days	9 days	9 days
Total	1 day	27 days	21 days	24 days

# The Purpose of Today

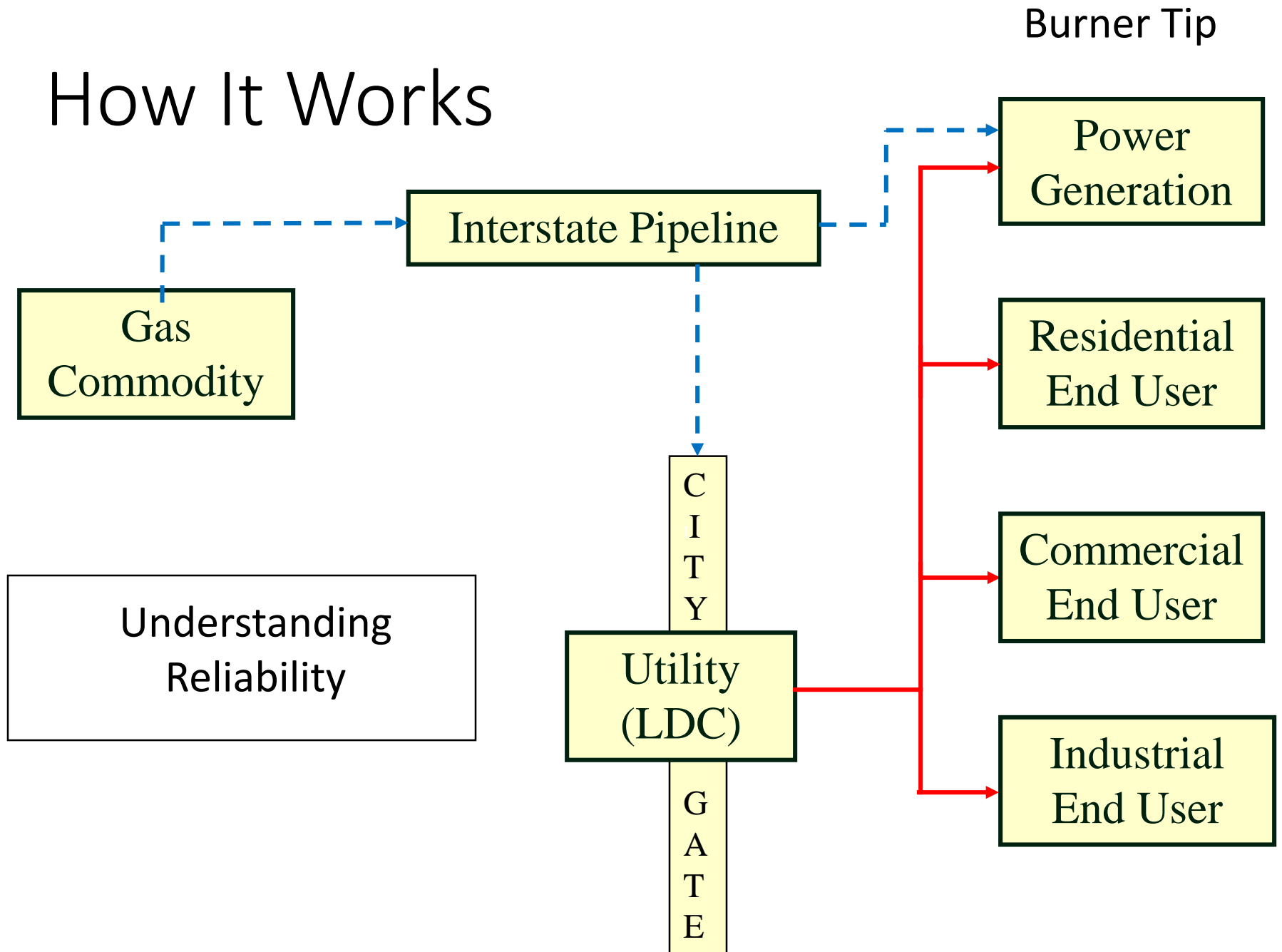


- To gain a better understanding of what happened in Wisconsin last winter with natural gas deliveries and natural gas prices.
- To discuss physical deliverability into Wisconsin in order to identify potential concerns facing the state.
- To take what we learn today and determine the next best steps for Wisconsin businesses.

To Wisconsin..



# How It Works

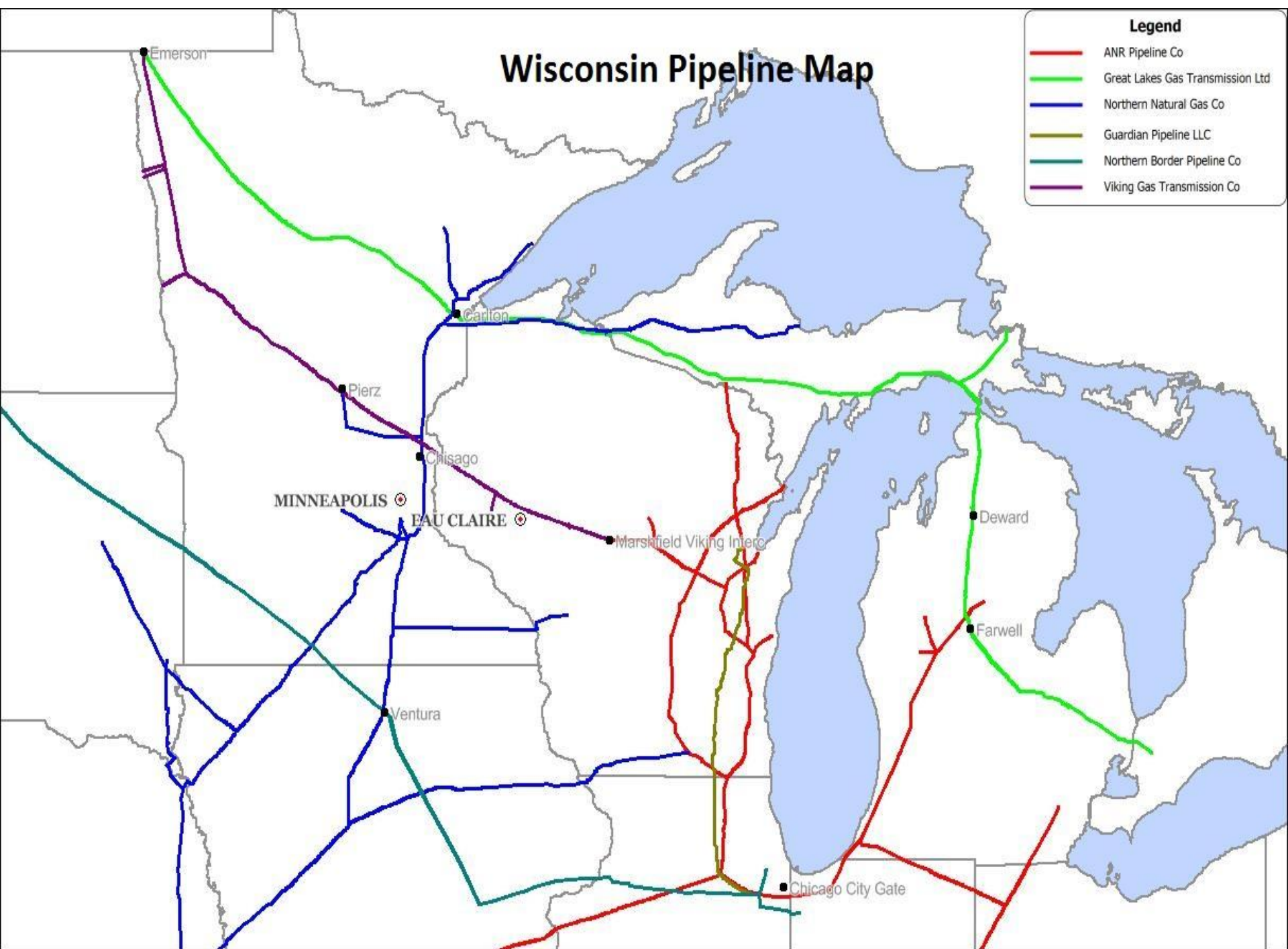




# Wisconsin Pipeline Map

## Legend

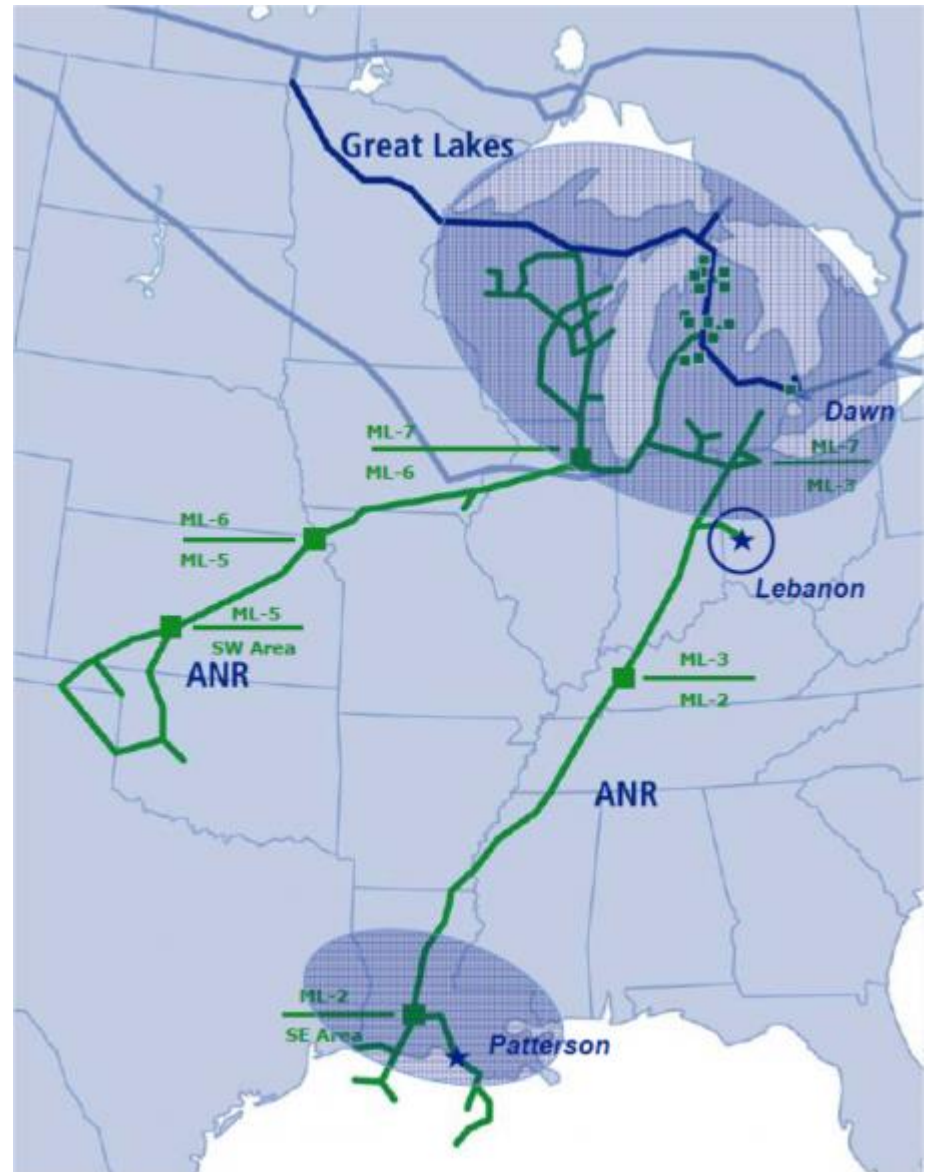
- ANR Pipeline Co
- Great Lakes Gas Transmission Ltd
- Northern Natural Gas Co
- Guardian Pipeline LLC
- Northern Border Pipeline Co
- Viking Gas Transmission Co





# Supply Sources

- Direct access to supply:
  - ANR: Louisiana, Kansas, Texas
    - Plus interconnection at Joliet, IL
  - Great Lakes: Canada
  - Viking: Canada
  - Northern Natural: Kansas, Oklahoma, Texas
- Interconnections that extend into Wisconsin:
  - Guardian: Connects with Joliet, IL Hub
- **Joliet, IL Hub Interconnections:**
  - ANR, Alliance, Guardian, Horizon, Kinder Morgan, NGPL, Northern Border, Midwestern, and Vector Pipelines



# Understanding “Reliability”

It's all about  
the  
contract!



Image courtesy of Nabucco Gas Pipeline International GmbH

# Reserving Pipeline Capacity

- Tariffed rates approved by the Federal Energy Regulatory Commission (FERC).
- Firm Service
  - Guaranteed “space” on a **specified route (path)**.
    - Some points can be both a receipt and a delivery point.
  - Cost Includes most of the “fixed” costs associated with building the facilities (reservation cost) plus variable costs with moving the gas volumes.
- Interruptible Service
  - Allows shippers to move gas if pipeline space is available.
    - Takes a “back-seat” to firm service.
  - Cost includes a relatively small portion of “fixed costs” plus variable costs with moving the gas volumes.

# Understanding Load Factors and Cost Implications

- 500 dth per day of pipeline capacity reserved.
- Reservation cost per dth is \$10 for a monthly total of \$5,000 (500 x \$10).
- Variable cost is \$.015 per dth when space is used.

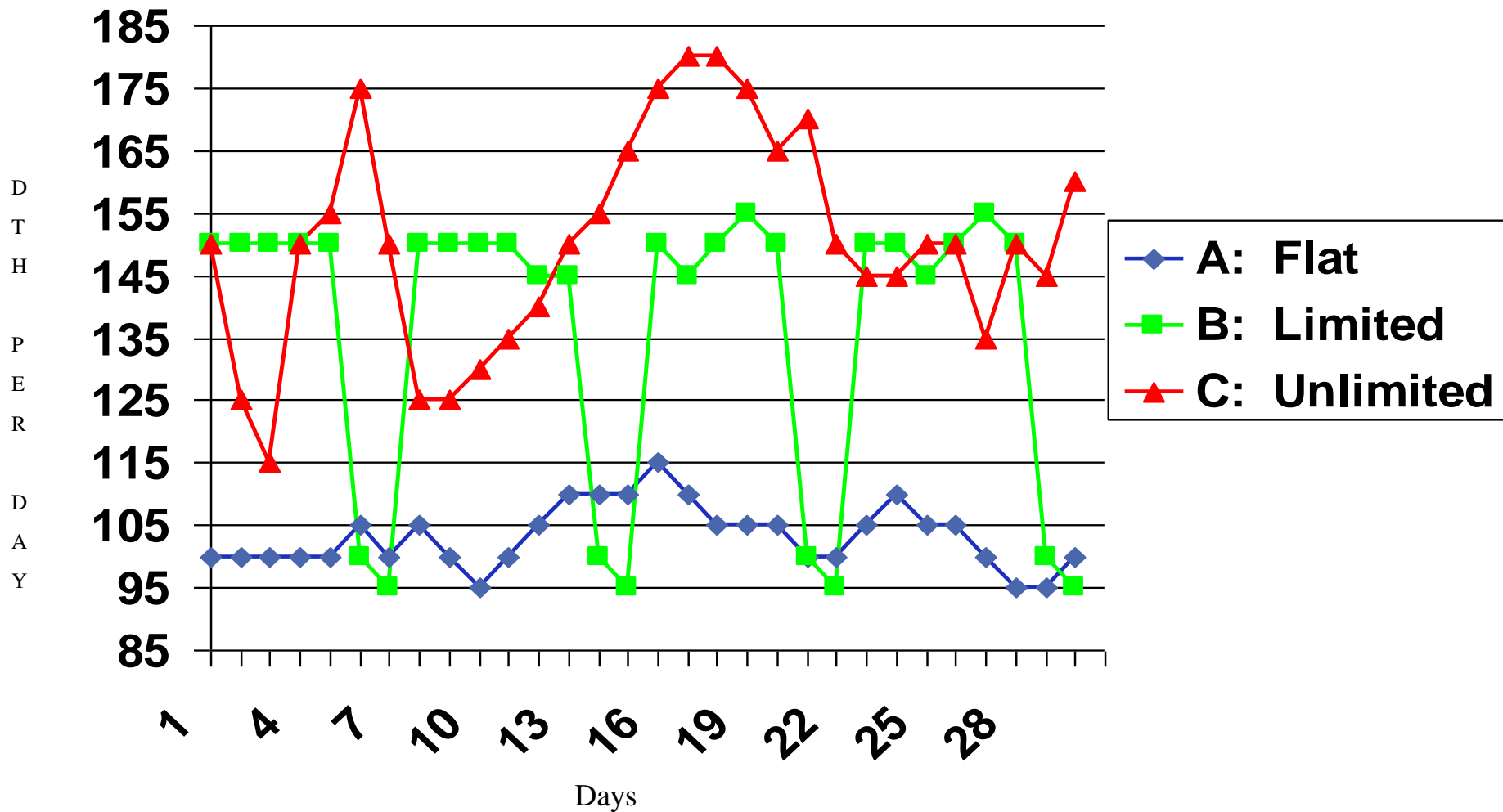
## Customer A:

- Usage is 15,000 dth during the month (500 dth x 30 days)
- Reservation cost: \$.333 per dth (\$5,000 / 15,000 dth)
- Variable cost: \$.015 per dth
- Total per unit cost of \$.348 per dth
- 100% utilization of space

## Customer B:

- Usage is 10,000 dth during the month
- Reservation cost: \$.500 per dth (\$5,000 / 10,000 dth)
- Commodity cost: \$.015 per dth
- Total per unit cost of \$.515 per dth
- 66% utilization of space

# How Natural Gas is Consumed



# Reselling Reserved Pipeline Capacity

- Firm shippers (primary market) can “release” unneeded pipeline capacity for sale via the pipeline website.
  - Referred to as capacity release (secondary market).
  - Firm shipper (releasing shipper) specifies:
    - Volume and timeframe of the release.
    - Receipt and delivery points of the release.
    - Minimum price accepted.
    - Whether the release is callable and the parameters of the recall.
- Bidder with the highest “value” bid wins and becomes the “acquiring shipper.”
  - Acquiring shipper determines ultimate reliability of pipeline capacity.



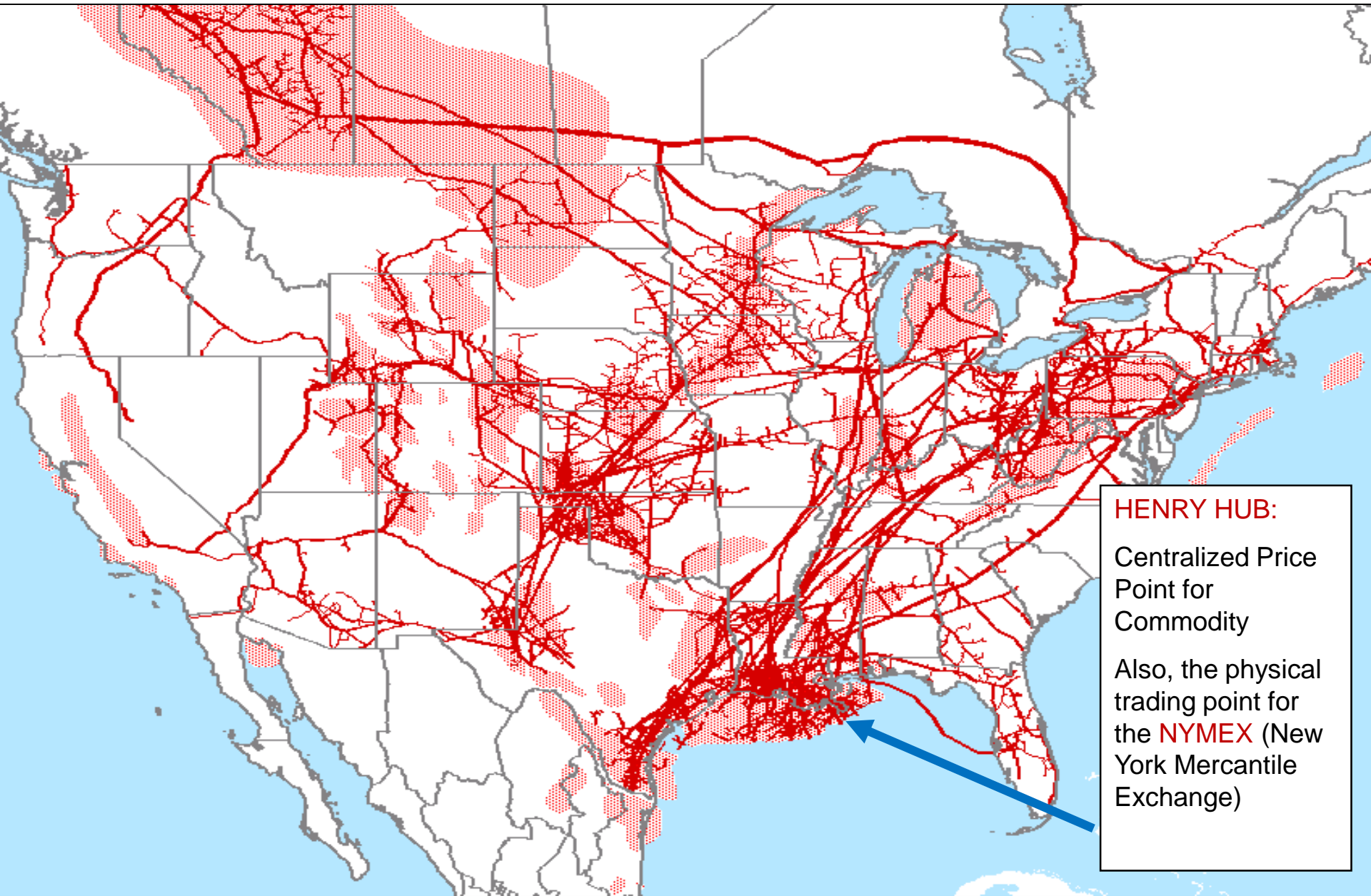
# Scheduling Pipeline Capacity

- No-Notice
- Primary Firm
- Secondary Firm
  - When the receipt point or delivery point is modified from the underlying contract.
- Interruptible

# Understanding “Costs”

It's all about the contract  
AND demand!

# Historical U.S. and Canada Interstate Pipelines



February 24, 2014

This is SPOT MARKET.



# What is Spot Market Basis?

- Price difference between the Henry Hub price and the corresponding cash spot price (physical price) at another specified location.
- Henry Hub, Louisiana, serves as the official delivery location for the New York Mercantile Exchange Contract (NYMEX) futures contracts.
  - Prices at the Henry Hub are utilized as benchmarks for the natural gas market throughout North America.

# Issues That Impact Basis Costs

- Demand

- Higher-than-average or lower-than-average demand
- Storage inventory levels

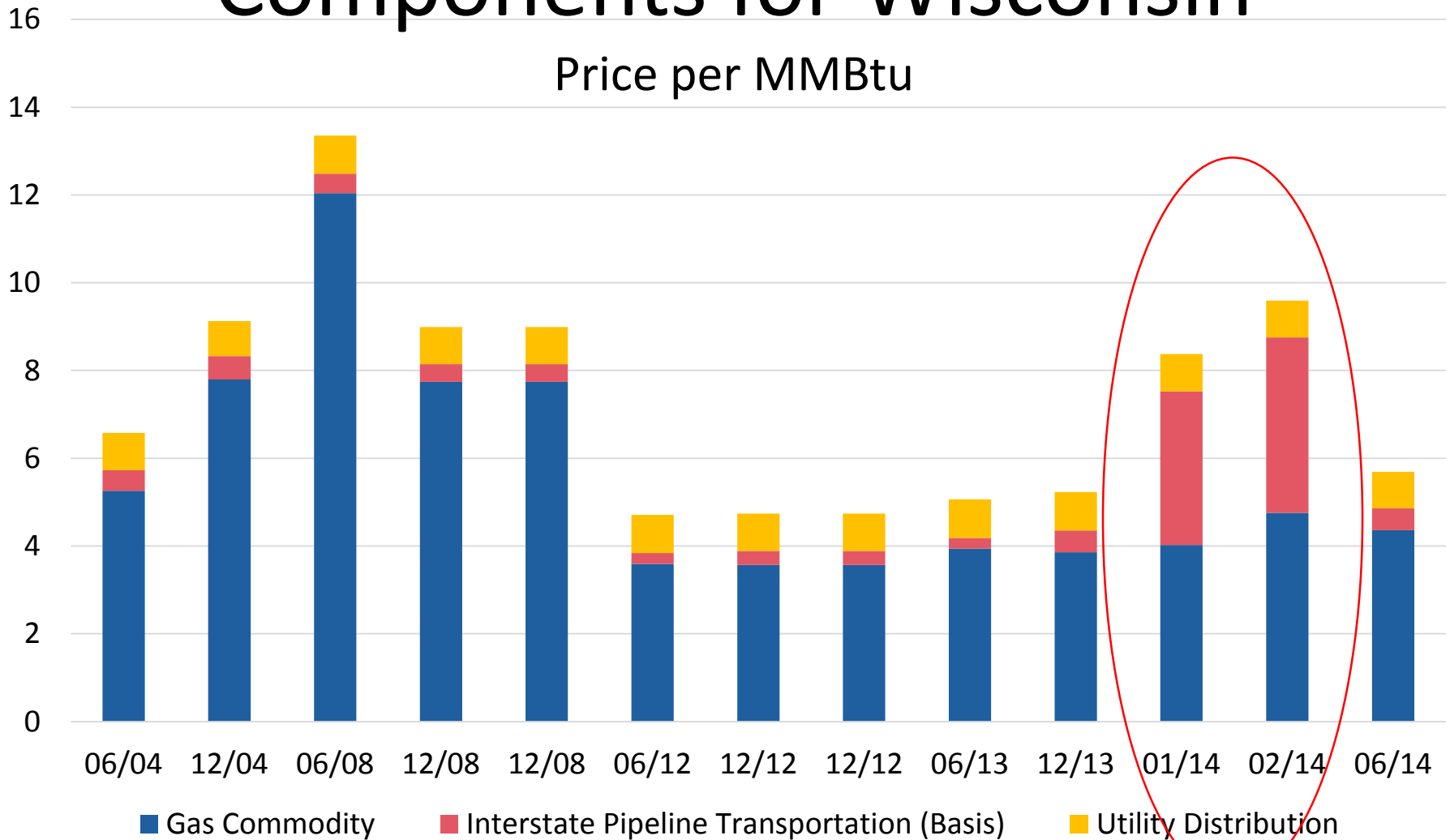
- Pipeline Capacity Constraints

- Physical delivery point and its proximity to actual supply
- Level of Reliability
  - Price differential for primary firm vs. secondary firm

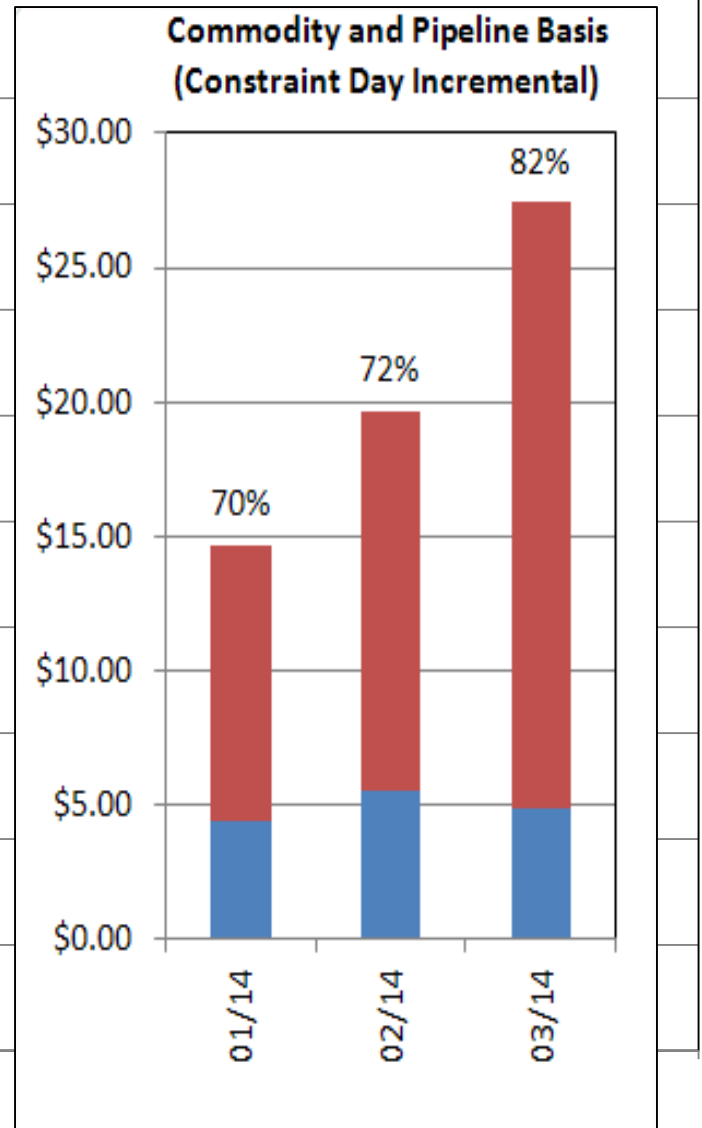
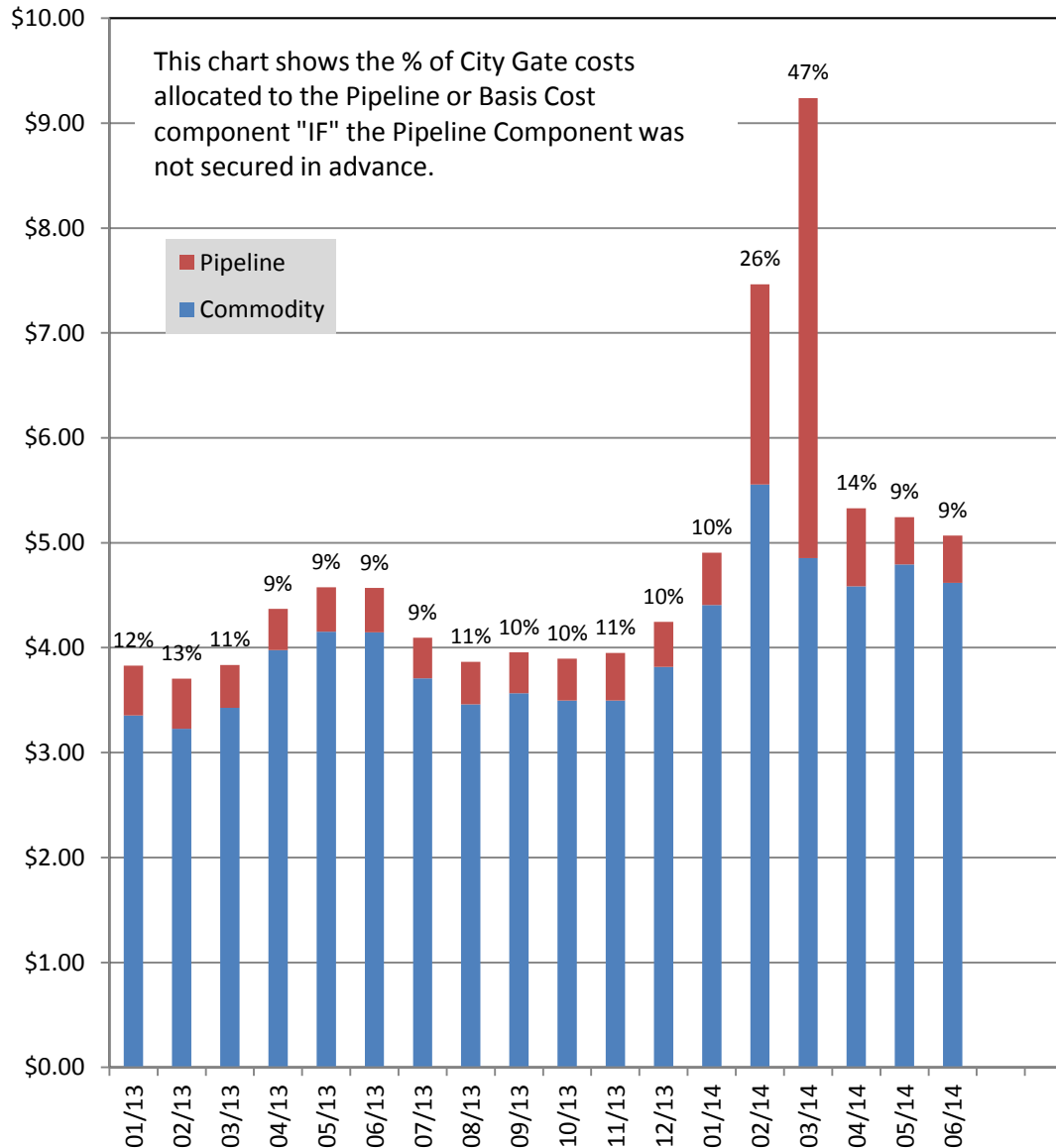


# Spot Market Cost Components for Wisconsin

Price per MMBtu



## Wisconsin: Commodity and Pipeline Basis (Beginning of Month - Spot Market)



## Lower 48 states shale plays



Source: Energy Information Administration based on data from various published studies.  
Updated: May 9, 2011



June 10, 2014

This is SPOT MARKET.



# Natural gas prices

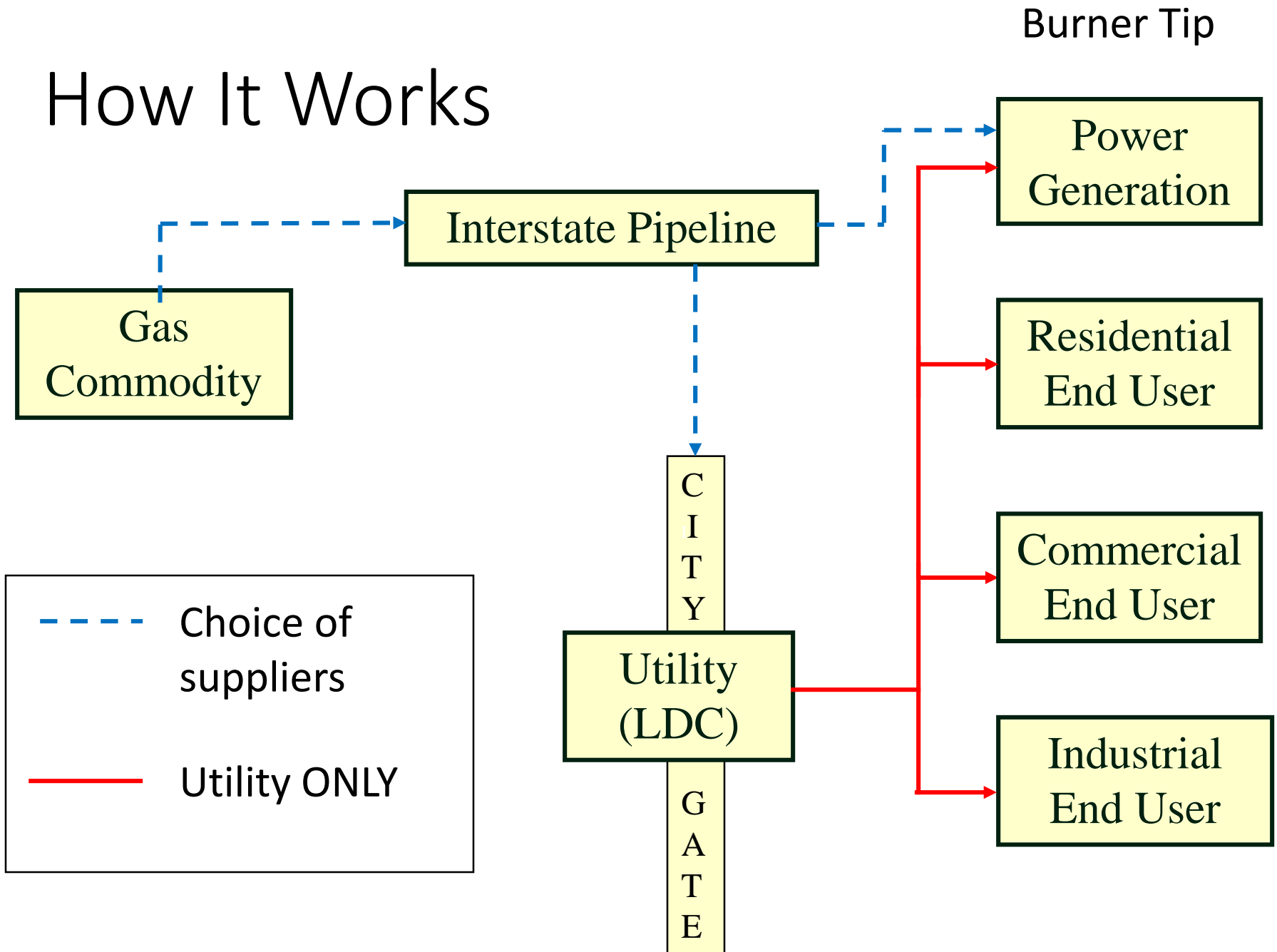
- Where is gas priced?
  - Point of Production (Wellhead)
  - City Gate (commodity + pipeline transportation)
  - Trading Hub (like Joliet, IL)
- How is gas priced?
  - Spot Market (Current Price)
  - Index (Published prices reflective of buying and selling)
    - Daily and Beginning-of-Month
  - Forward Market
    - Via the use of the NYMEX market (to be discussed more in Gas Risk Mitigation Strategies).

# Putting the pieces together

- Contracted Reliability
  - Represents ability to deliver.
- Contracted Price
  - Represents the cost to deliver natural gas to a specific point under the specified contracted reliability.



# How It Works

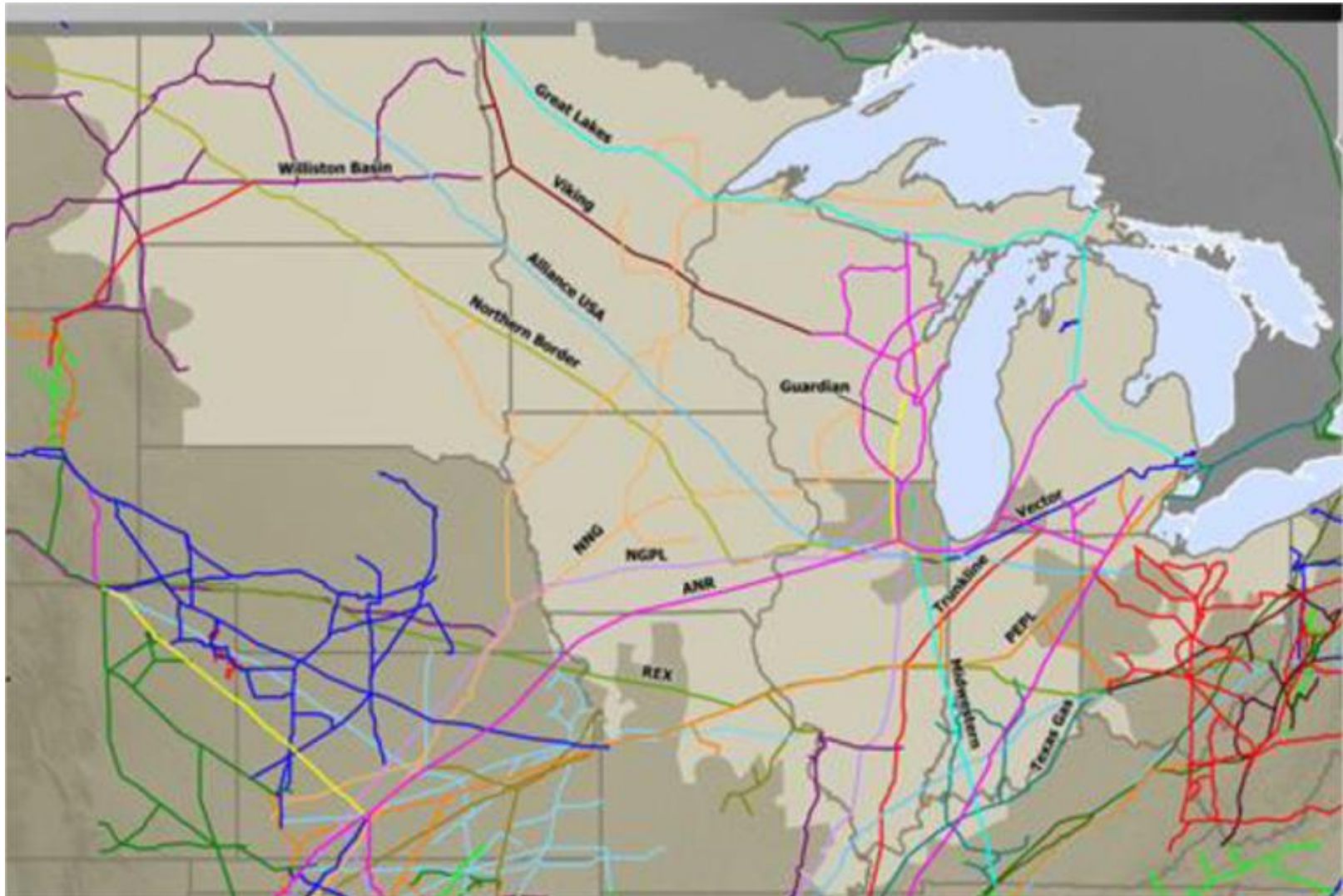


# Putting the pieces together

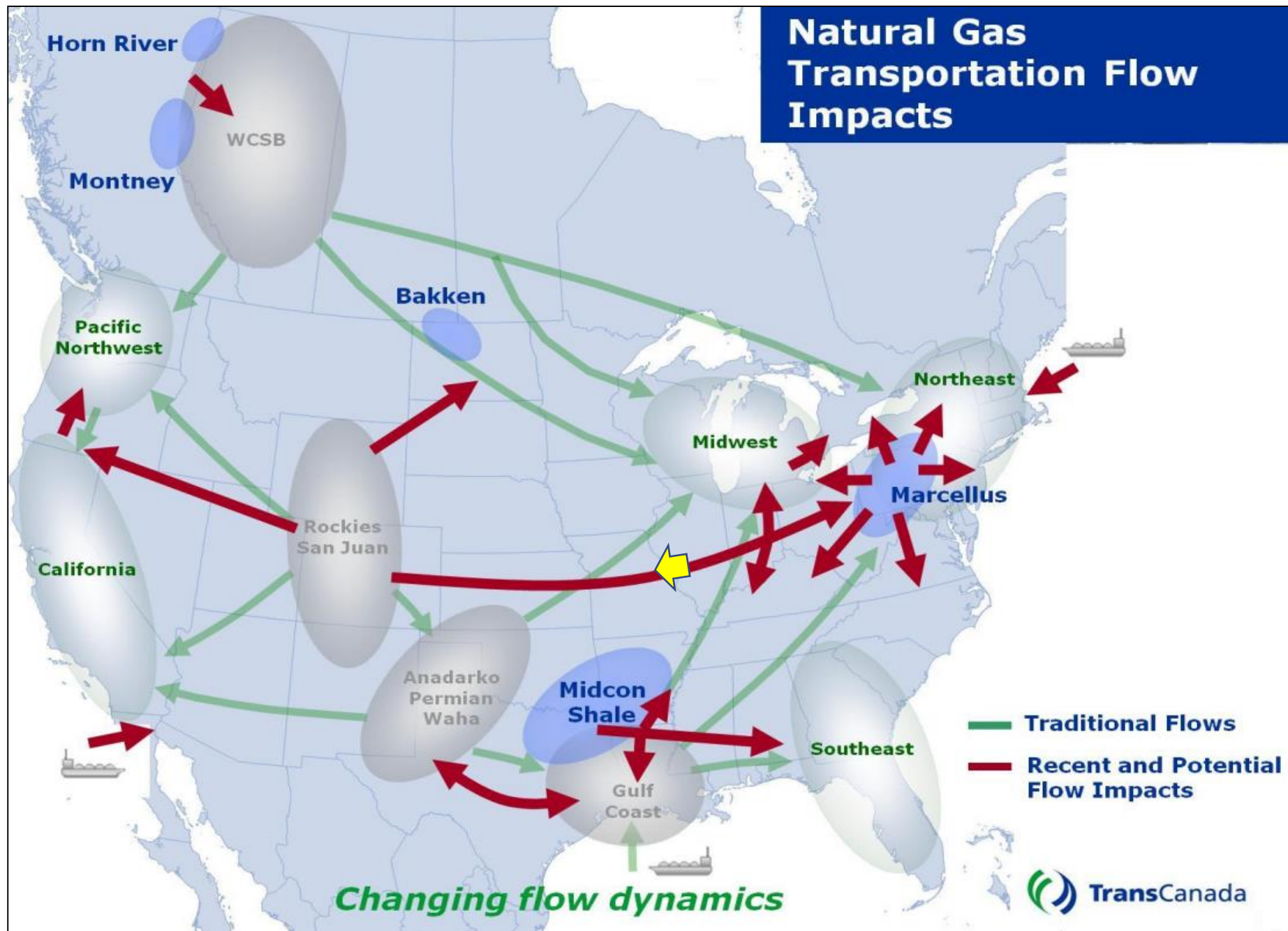
- System supply service customers
  - Contracts directly for distribution with the utility.
  - Commodity and pipeline transportation contracted by utility on customer's behalf.
  - Utility is regulated by the Public Service Commission.
- Transportation service customers
  - Contracts directly for distribution with the utility.
  - Commodity contracted for directly with producer or through natural gas marketer.
  - Pipeline transportation contracted for directly with interstate pipeline or through natural gas marketer.
  - Natural gas producers and marketers are not regulated.
  - Customers needs to make sure they understand what they've contracted for (reliability and price).

# Looking Ahead ...

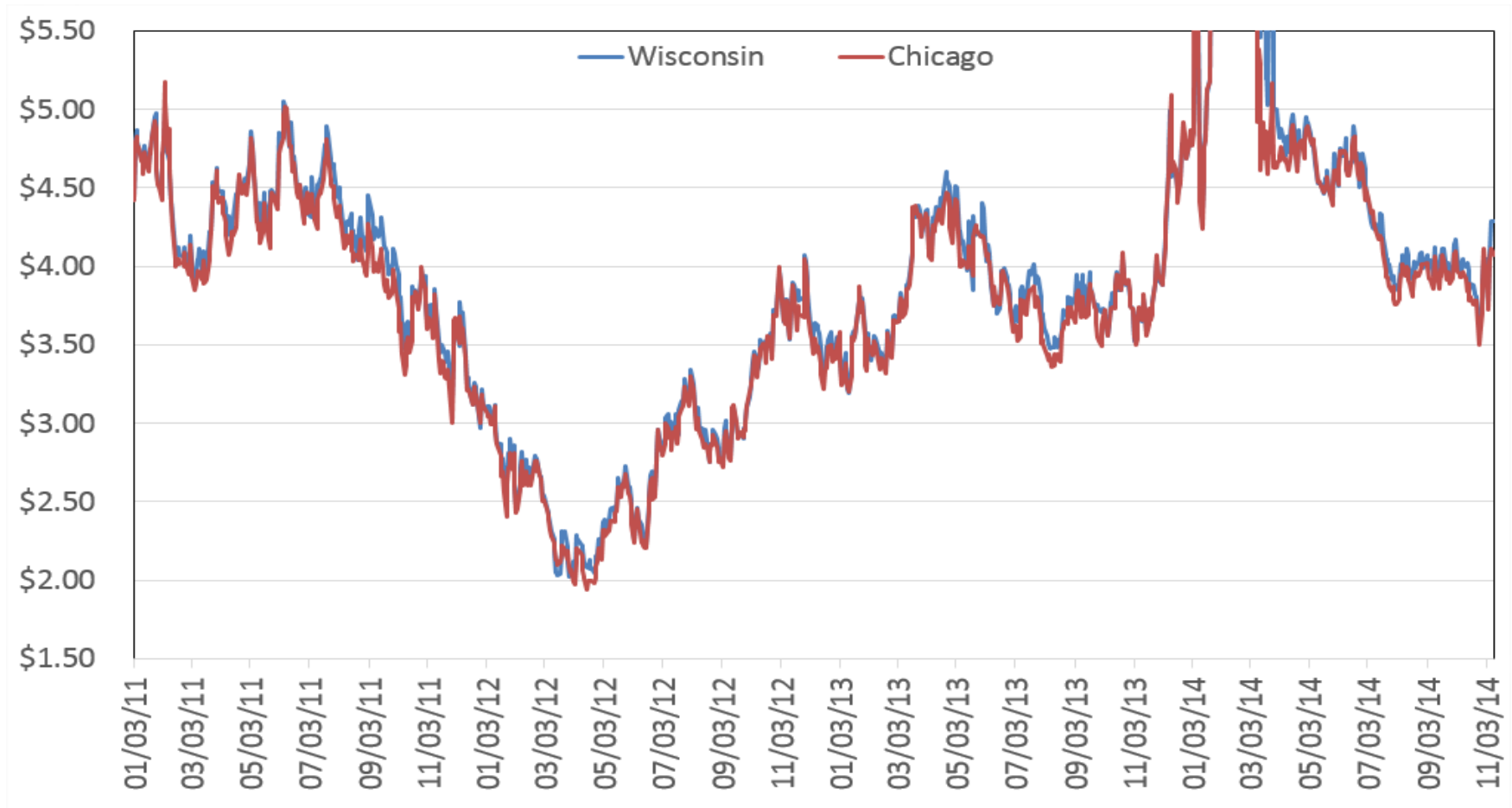
## It's About More than Just Wisconsin



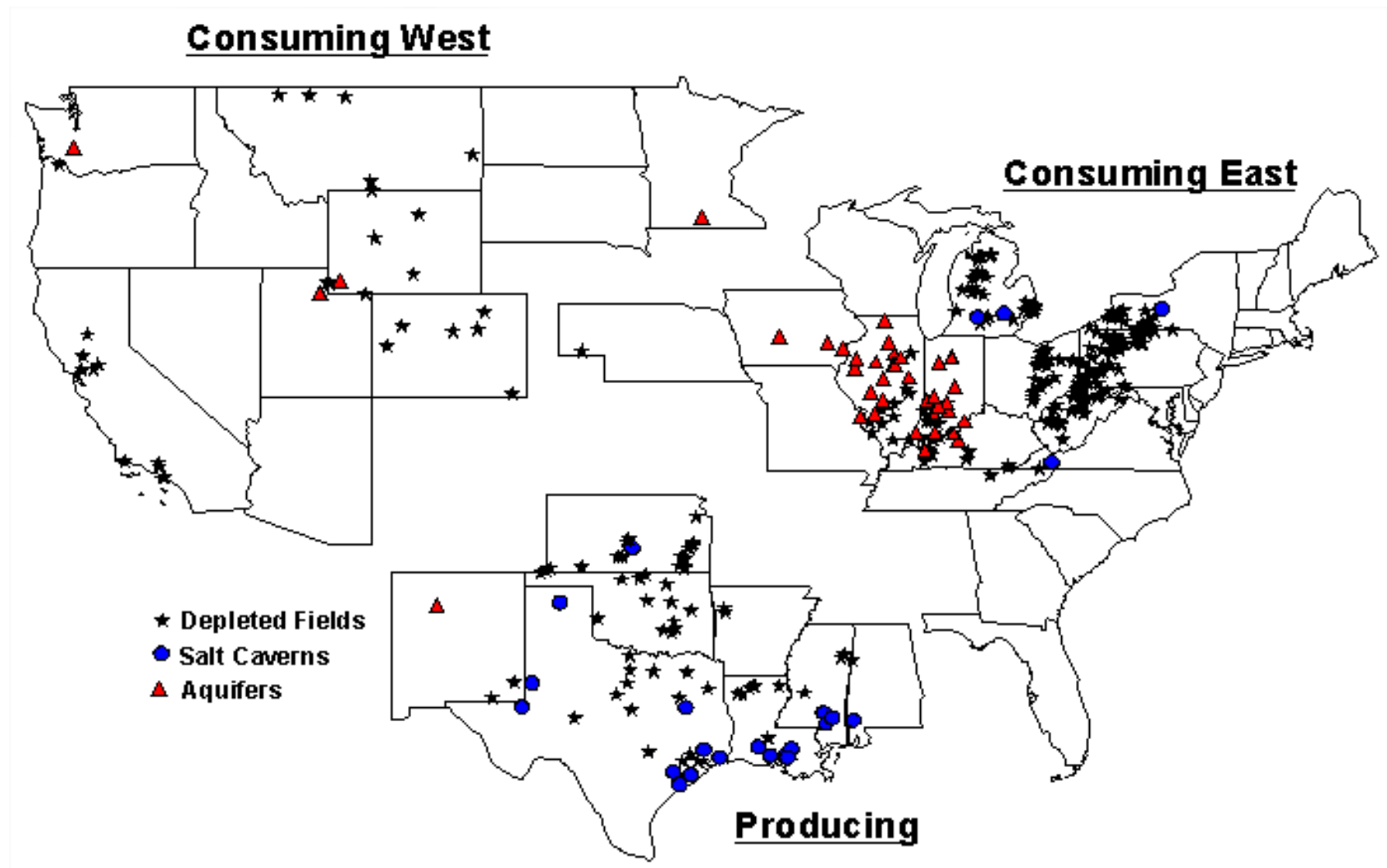
# Natural Gas Transportation Flow Impacts



# Tight Price Relationship to Chicago (Price per MMBtu)



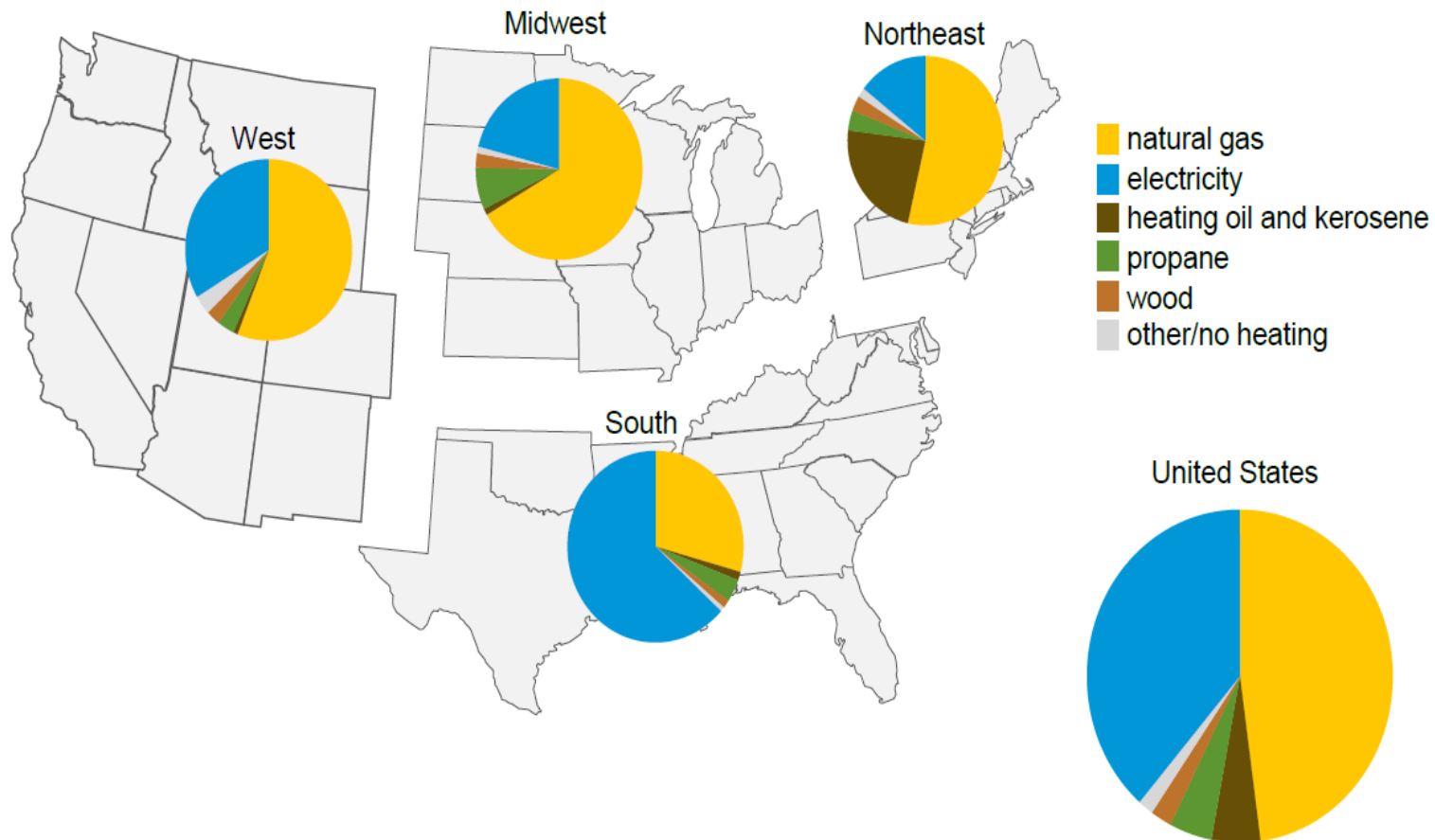
# U.S. Natural Gas Storage Fields





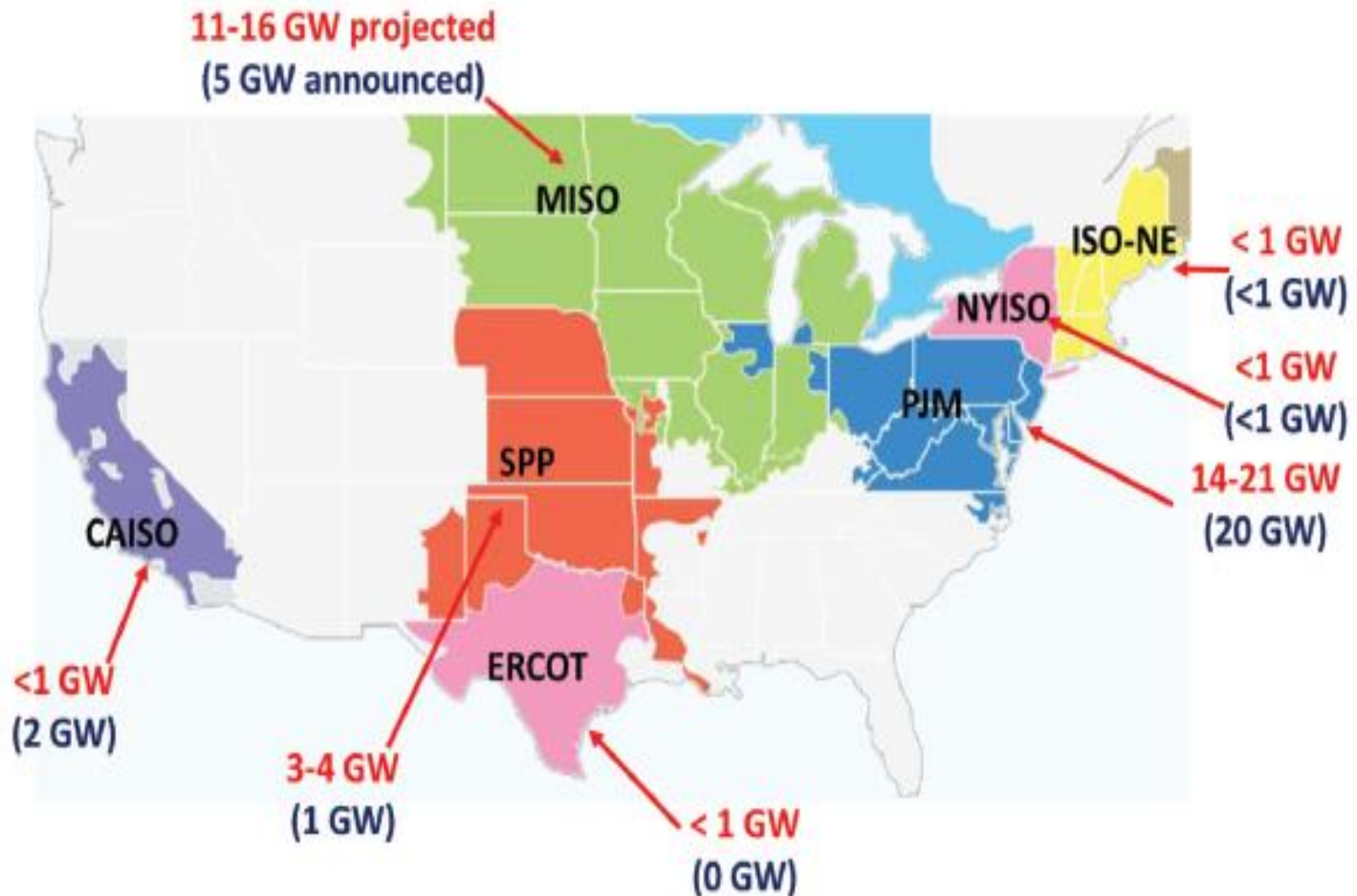
# Heating Fuel Market Shares

Share of homes by primary space heating fuel and Census Region



Source: EIA calculations based on the U.S. Census Bureau, 2013 American Community Survey.

# Announced and Projected Coal Retirements by Region

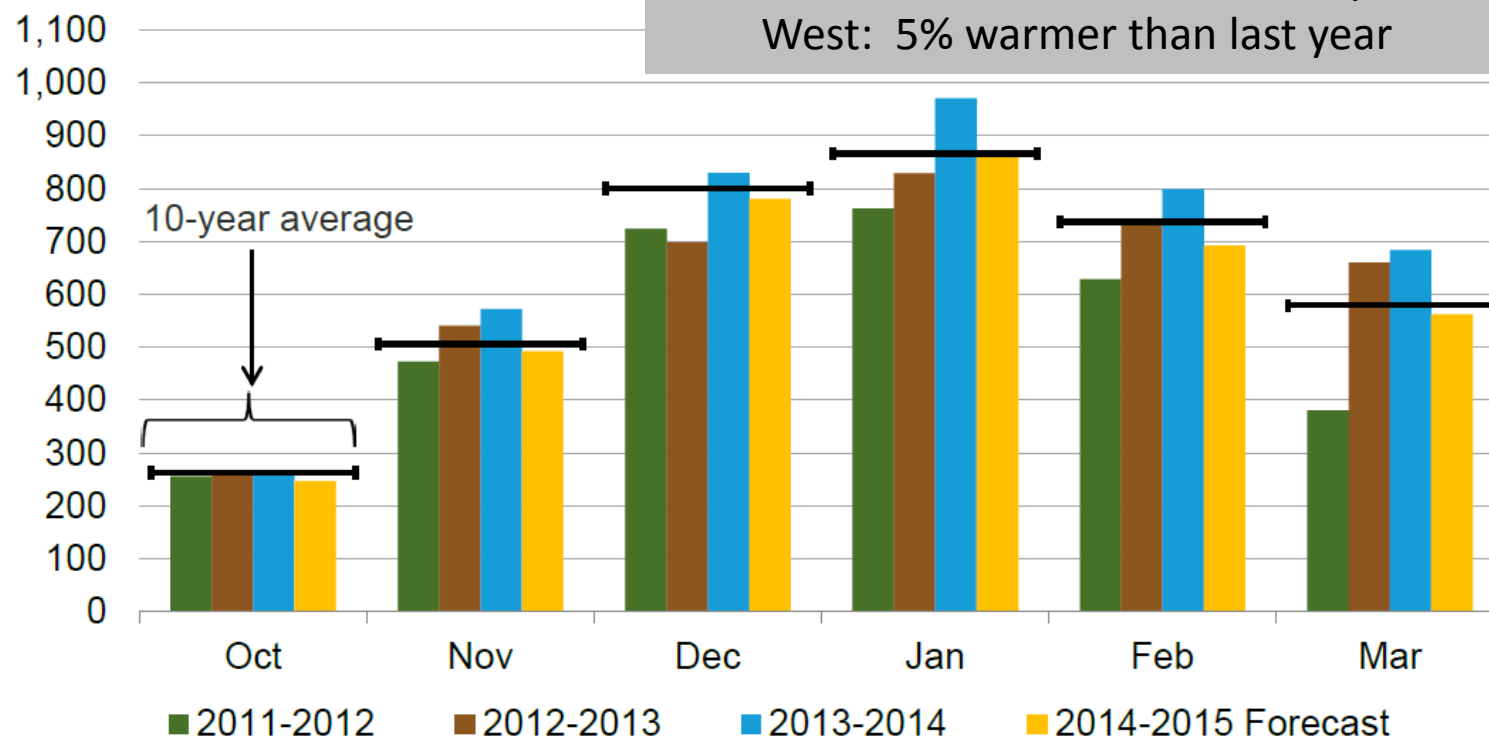


Source: The Brattle Group

# NOAA Heating Degree Day Forecast:

HDDs will be 12% lower than last winter

U.S. current population-weighted heating degree days



Note: EIA calculations based on National Oceanic and Atmospheric Administration (NOAA) data. Horizontal lines indicate 10-year average over the period Oct. 2004 – Mar. 2014. Projections reflect NOAA's 14-16 month outlook.

Source: EIA Short-Term Energy Outlook, October 2014.

# Thank You

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**Let's Get Started!**

